

## **MULTI-PLY PRODUCTS COMPRISING A CONSUMER ACCESSIBLE TAB**

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### **Field of the Invention**

The present invention relates to multi-ply products, especially rolled multi-ply products, more particularly rolled multi-ply sanitary tissue products comprising a consumer accessible tab and methods for making same.

### **Background of the Invention**

Multi-ply products, especially rolled multi-ply products, more particularly rolled multi-ply sanitary tissue products, such as toilet tissue, have conventionally been problematic for consumers to locate the starting end of the multi-ply product and/or dispense the multi-ply product during use without damaging the multi-ply product. The problem of damaging the multi-ply product, especially a rolled multi-ply product is especially evident in conventional rolled multi-ply toilet tissue products. For example, a consumer may attempt to start dispensing a rolled two-ply toilet tissue product by inadvertently grabbing only the exterior ply of the two-ply toilet tissue product and thus causing the two plies to become separated. The end result is that the consumer dispenses only one ply of the two ply product which creates alignment issues with the sheets of the product. This problem associated with multi-ply products, especially rolled multi-ply sanitary tissue products is called "skinning the roll."

Accordingly, there is a need for a multi-ply product, especially a multi-ply sanitary tissue product, more particularly a rolled multi-ply sanitary tissue product that prevents and/or mitigates the risk of a consumer skinning the multi-ply product by dispensing less than the total number of plies of the multi-ply product.

### **Summary of the Invention**

The present invention fulfills the need described above by providing a multi-ply product with a consumer accessible tab.

In one aspect of the present invention, a multi-ply product comprising a multi-ply fibrous structure having a tail end and a core end, wherein the tail end of the multi-ply fibrous structure comprises a consumer accessible tab, is provided.

In another aspect of the present invention, a rolled multi-ply product comprising a multi-ply fibrous structure having a tail end and a core end, wherein the multi-ply fibrous structure is freely, convolutely wound upon itself from the core end out to the tail end to form the rolled multi-ply product, wherein the tail end of the fibrous structure comprises a consumer accessible tab, is provided.

In yet another aspect of the present invention, a method for making a consumer accessible tab for use in a multi-ply product comprising a multi-ply fibrous structure, is provided.

In still another aspect of the present invention, a method for making a multi-ply product comprising a multi-ply fibrous structure, wherein the multi-ply product comprises a consumer accessible tab, is provided.

In even yet another aspect of the present invention, a method for making a rolled multi-ply product comprising a multi-ply fibrous structure, wherein the rolled multi-ply product comprises a consumer accessible tab, is provided.

Accordingly, the present invention provides a multi-ply product comprising a consumer accessible tab, a rolled multi-ply product comprising a consumer accessible tab, a method for making a consumer accessible tab for use in a multi-ply product, a method for making a multi-ply product comprising a consumer accessible tab and a method for making a rolled multi-ply product comprising a consumer accessible tab.

#### **Brief Description of the Drawings**

Fig. 1A is a schematic top planar view of one embodiment of a multi-ply product in accordance with the present invention;

Fig. 1B is a schematic side, cross-sectional view along line 1B-1B of the multi-ply product of Fig. 1A;

Fig. 1C is a schematic view of the multi-ply product of Fig. 1B in roll form;

Fig. 2A is a schematic top planar view of another embodiment of a multi-ply product in accordance with the present invention;

Fig. 2B is a schematic side, cross-sectional view along line 2B-2B of the multi-ply product of Fig. 2A;

Fig. 2C is a schematic view of the multi-ply product of Fig. 2B in roll form;

Fig. 3 is a schematic representation of a method for making a multi-ply product in accordance with the present invention;

Fig. 4 is a partial schematic representation of a method for making a rolled multi-ply product in accordance with the present invention.

## Detailed Description of the Invention

### Definitions

“Fiber” as used herein means an elongate particulate having an apparent length greatly exceeding its apparent width, i.e. a length to diameter ratio of at least about 10. More specifically, as used herein, “fiber” refers to papermaking fibers. The present invention contemplates the use of a variety of papermaking fibers, such as, for example, natural fibers or synthetic fibers, or any other suitable fibers, and any combination thereof. Papermaking fibers useful in the present invention include cellulosic fibers commonly known as wood pulp fibers. Applicable wood pulps include chemical pulps, such as Kraft, sulfite, and sulfate pulps, as well as mechanical pulps including, for example, groundwood, thermomechanical pulp and chemically modified thermomechanical pulp. Chemical pulps, however, may be preferred since they impart a superior tactile sense of softness to tissue sheets made therefrom. Pulps derived from both deciduous trees (hereinafter, also referred to as “hardwood”) and coniferous trees (hereinafter, also referred to as “softwood”) may be utilized. The hardwood and softwood fibers can be blended, or alternatively, can be deposited in layers to provide a stratified web. U.S. Pat. No. 4,300,981 and U.S. Pat. No. 3,994,771 are incorporated herein by reference for the purpose of disclosing layering of hardwood and softwood fibers. Also applicable to the present invention are fibers derived from recycled paper, which may contain any or all of the above categories as well as other non-fibrous materials such as fillers and adhesives used to facilitate the original papermaking. In addition to the above, fibers and/or filaments made from polymers, specifically hydroxyl polymers may be used in the present invention. Nonlimiting examples of suitable hydroxyl polymers include polyvinyl alcohol, starch, starch derivatives, chitosan, chitosan derivatives, cellulose derivatives, gums, arabinans, galactans and mixtures thereof.

“Consumer accessible tab” as used herein means a part of the multi-ply fibrous structure near the tail end of the fibrous structure that is accessible to a consumer using a never-before-used (i.e., brand new) multi-ply product.

“Convolutely wound” as used herein means that a material is rolled or folded together with one part over another in a non-bound manner. In other words, no adhesive binds one overlapping part to the other in the roll.

“Sanitary tissue product” as used herein means a fiber-containing web useful as a wiping implement for post-urinary and post-bowel movement cleaning (toilet tissue), for otorhinolaryngological discharges (facial tissue), and multi-functional absorbent and cleaning uses (absorbent towels).

“Weight average molecular weight” as used herein means the weight average molecular weight as determined using gel permeation chromatography according to the protocol found in

Colloids and Surfaces A. Physico Chemical & Engineering Aspects, Vol. 162, 2000, pg. 107-121.

“Machine Direction” or “MD” as used herein means the direction parallel to the flow of the fibrous structure through the papermaking machine and/or product manufacturing equipment.

5 “Cross Machine Direction” or “CD” as used herein means the direction perpendicular to the machine direction in the same plane of the fibrous structure and/or paper product comprising the fibrous structure.

“Ply” or “Plies” as used herein means an individual fibrous structure optionally to be disposed in a substantially contiguous, face-to-face relationship with other plies, forming a multi-  
10 ply fibrous structure. It is also contemplated that a single fibrous structure can effectively form two “plies” or multiple “plies”, for example, by being folded on itself.

“Basis Weight” as used herein is the weight per unit area of a sample reported in lbs/3000 ft<sup>2</sup> or g/m<sup>2</sup>.

Basis weight is measured by preparing one or more samples of a certain area (m<sup>2</sup>) and  
15 weighing the sample(s) of a fibrous structure according to the present invention and/or a paper product comprising such fibrous structure on a top loading balance with a minimum resolution of 0.01 g. The balance is protected from air drafts and other disturbances using a draft shield. Weights are recorded when the readings on the balance become constant. The average weight (g) is calculated and the average area of the samples (m<sup>2</sup>). The basis weight (g/m<sup>2</sup>) is calculated by  
20 dividing the average weight (g) by the average area of the samples (m<sup>2</sup>).

### **Fibrous Structure**

The fibrous structure may be foreshortened, such as via creping, or non-foreshortened, such as not creping.

The fibrous structures of the present invention are useful in paper, especially sanitary  
25 tissue paper products including, but not limited to: conventionally felt-pressed tissue paper; through-air dried tissue paper; pattern densified tissue paper; and high-bulk, uncompacted tissue paper. The tissue paper may be of a homogenous or multilayered construction; and tissue paper products in accordance with the present invention are of a multi-ply construction. The tissue paper preferably has a basis weight of between about 10 g/m<sup>2</sup> and about 120 g/m<sup>2</sup>, and density of about  
30 0.60 g/cc or less. Preferably, the basis weight will be below about 35 g/m<sup>2</sup>; and the density will be about 0.30 g/cc or less. Most preferably, the density will be between about 0.04 g/cc and about 0.20 g/cc as measured by the Basis Weight Method described herein.

The fibrous structure may be made with a fibrous furnish that produces a single layer embryonic fibrous web or a fibrous furnish that produces a multi-layer embryonic fibrous web.

### **Multi-ply Product**

The multi-ply product of the present comprises a multi-ply (i.e., two or more plies) fibrous structure. The multi-ply product may be in roll form, thus producing a rolled multi-ply product.

5 In one embodiment of the present invention, as shown in Figs. 1A-C, the multi-ply product **10'** of the present invention comprises a multi-ply fibrous structure **10** having a first ply **20** and a second ply **22**. The multi-ply of the fibrous structure **10** may be ply bonded together in a face-to-face manner by any suitable means known to those of ordinary skill in the art, such as by mechanical, chemical and/or electrostatic forces. Typically, a ply bond adhesive is used to  
10 bond the multi-ply together. The ply bond adhesive is typically applied to at least a surface of at least one ply which will be in contact with one or more surfaces of other plies. Further, typically the ply bond adhesive is applied in the machine direction.

The multi-ply fibrous structure **10** comprises a core end **12** and a tail **14** comprising a tail end **16**.

15 As shown in Fig. 1C, the multi-ply fibrous structure **10** may be in the form of a rolled multi-ply product **10'**. In order to produce the rolled multi-ply product **10'**, the multi-ply fibrous structure **10** may be freely, convolutely wound from the core end **12** out to the tail end **16** around core **24**. In another embodiment, the multi-ply fibrous structure **10** may be rolled without the use of a core (not shown). The tail end **16** of the multi-ply fibrous structure **10** comprises a consumer  
20 accessible tab **18** permitting a consumer to begin dispensing a never-before-used multi-ply product, especially a rolled multi-ply product **10'**, by grasping the consumer accessible tab **18** and dispensing the multi-ply product, such as the rolled multi-ply product **10'**.

In one embodiment, the consumer accessible tab **18** may comprise two or more plies of fibrous structure that are bonded together via an adhesive. The adhesive may be applied in the  
25 machine direction and/or the cross machine direction, preferably at least in the cross machine direction. Any suitable adhesive can be used for forming the consumer accessible tab **18**. Nonlimiting examples of suitable adhesives, especially water soluble polymer adhesives are commercially available from Henkel Adhesives, National Starch and Chemical Company and HB Fuller. A nonlimiting example of a suitable water soluble polymer adhesive from National Starch  
30 is 18-345B.

In one embodiment, the adhesive is such that the adhesive only bonds the two or more plies of the fibrous structure making up the consumer accessible tab **18** without migrating through the consumer accessible tab plies to another ply or plies of fibrous structure that are not part of the consumer accessible tab **18**. This is especially true when the multi-ply fibrous structure **10** is in

rolled form. In other words, the adhesive used in the consumer accessible tab **18** preferably does not bond the consumer accessible tab **18** to another portion of the multi-ply fibrous structure **10**.

The consumer accessible tab **18** may extend from the tail end **16** or from about the tail end **16** toward the core end **12** along the multi-ply fibrous structure **10** in the machine direction. In one embodiment, the consumer accessible tab **18** extend from the tail end **16** or about the tail end **16** toward the core end **12** along the multi-ply fibrous structure **10** in the machine direction for a distance of from about 2 cm to about 15 cm, preferably from about 3 cm to about 10 cm and/or from about 4 cm to about 8 cm. However, the consumer accessible tab **18** may extend a longer distance or a shorter distance from the tail end **16** or about the tail end **16**.

The consumer accessible tab **18** may extend completely or partially across the multi-ply fibrous structure **10** in the cross machine direction.

The rolled multi-ply product **10'** may comprise a tail seal glue **21** that binds the tail **14** of the multi-ply fibrous structure **10** when in roll form to itself, another portion of the multi-ply product **10**.

In one embodiment, the consumer accessible tab **18** or any portion thereof is more proximal to the tail end **16** of the rolled multi-ply product **10'** than is the tail seal glue **21**.

As shown in Figs. 2A-C, the multi-ply product **10''** of the present invention comprises a multi-ply fibrous structure **10''** having a first ply **20''** and a second ply **22''**. The multi-ply of the fibrous structure **10''** may be ply bonded together in a face-to-face manner by any suitable means known to those of ordinary skill in the art, such as by mechanical, chemical and/or electrostatic forces. Typically, a ply bond adhesive is used to bond the multi-ply together. The ply bond adhesive is typically applied to at least a surface of at least one ply which will be in contact with one or more surfaces of other plies. Further, typically the ply bond adhesive is applied in the machine direction.

The multi-ply fibrous structure **10''** comprises a core end **12''** and a tail **14''** comprising a tail end **16''**.

As shown in Fig. 2C, the multi-ply fibrous structure **10''** may be in the form of a rolled multi-ply product **10'''**. In order to produce the rolled multi-ply product **10'''**, the multi-ply fibrous structure **10''** may be freely, convolutely wound from the core end **12''** out to the tail end **16''** around core **24''**. The tail end **16''** of the multi-ply fibrous structure **10''** comprises a consumer accessible tab **18''** permitting a consumer to begin dispensing a never-before-used roll of the rolled multi-ply product **10'''** by grasping the consumer accessible tab **18''** and dispensing the multi-ply product, such as the rolled multi-ply product **10'''**.

In one embodiment, the consumer accessible tab **18''** may comprise two or more plies of fibrous structure that are bonded together via an adhesive. The adhesive may be applied in the

machine direction and/or the cross machine direction, preferably at least in the cross machine direction. Any suitable adhesive can be used for forming the consumer accessible tab **18''**. Any suitable adhesive can be used for forming the consumer accessible tab **18**. Nonlimiting examples of suitable adhesives, especially water soluble polymer adhesives are commercially available from Henkel Adhesives, National Starch and Chemical Company and HB Fuller. A nonlimiting example of a suitable water soluble polymer adhesive from National Starch is 18-345B.

In one embodiment, the adhesive is such that the adhesive only bonds the two or more plies of the fibrous structure making up the consumer accessible tab **18''** without migrating through the consumer accessible tab plies to another ply or plies of fibrous structure that are not part of the consumer accessible tab **18''**. This is especially true when the multi-ply fibrous structure **10''** is in rolled form. In other words, the adhesive used in the consumer accessible tab **18''** preferably does not bond the consumer accessible tab **18''** to another portion of the multi-ply fibrous structure **10''**.

The consumer accessible tab **18''** may extend from the tail end **16''** or about the tail end **16''** toward the core end **12''** along the multi-ply fibrous structure **10''** in the machine direction. In one embodiment, the consumer accessible tab **18''** extend from the tail end **16''** or about the tail end **16''** toward the core end **12''** along the multi-ply fibrous structure **10''** in the machine direction for a distance of from about 2 cm to about 15 cm, preferably from about 3 cm to about 10 cm and/or from about 4 cm to about 8 cm. However, the consumer accessible tab **18''** may extend a longer distance or a shorter distance from the tail end **16''** or about the tail end **16''**.

The consumer accessible tab **18''** may extend completely or partially across the multi-ply fibrous structure **10''** in the cross machine direction.

The rolled multi-ply product **10'''** may comprise a tail seal glue **21''** that binds the tail **14''** of the multi-ply fibrous structure **10''** when in roll form to itself, another portion of the multi-ply fibrous structure **10''**.

In one embodiment, the consumer accessible tab **18''** or any portion thereof is more proximal to the tail end **16''** of the rolled multi-ply product **10'''** than is the tail seal glue **21''**.

Further, as shown in Figs. 2A-C, the core end **12''** may comprise a bonded area similar to the consumer accessible tab **18''**.

In one embodiment, the adhesive used in the consumer accessible tab is more concentrated than the ply bond adhesive used to bond the two or more plies together throughout the multi-ply fibrous structure.

In another embodiment, the bond strength within the consumer accessible tab is greater than the ply bond strength throughout the multi-ply fibrous structure.

### **Methods**

The multi-ply product of the present invention may be made by any suitable process known by those skilled in the art. A nonlimiting example of a suitable process for making a multi-ply product with a consumer accessible tab is described herein.

As shown in Fig. 3, two or more parent rolls, in this case parent roll **26** and parent roll **28** each containing their respective fibrous structures **26'** and **28'** may be unwound during the process of making a multi-ply fibrous structure **29** in accordance with the present invention.

The two plies of fibrous structure **26'** and **28'** may be ply bonded together by any suitable means known to those of ordinary skill in the art.

In one embodiment, at least one surface of at least one of the plies of fibrous structure, in this case the surface of fibrous structure ply **28'** may be contacted with an adhesive **32** by an adhesive applicator **30**. Preferably, the adhesive **32** extends across the surface of the fibrous structure **28'** in the cross machine direction.

A sufficient amount of the adhesive **32** is applied to the surface of fibrous structure ply **28'** in order to provide an effective consumer accessible tab **34''** in the ultimate multi-ply product, such as the rolled multi-ply product **29'**.

In one embodiment, the adhesive **32** is applied to the fibrous structure **28'** in the cross machine direction to form an adhesive area **34**.

Once the adhesive area **34** is formed, then fibrous structure ply **26'** and fibrous structure ply **28'** may be combined by any suitable means known to those of ordinary skill in the art. A nonlimiting example of a suitable means of combining the plies together is by passing the two plies through a marrying roll/combining roll system comprising roll **36** and roll **38**.

After the two plies **26'** and **28'** are combined together to form a multi-ply fibrous structure **29**, the multi-ply fibrous structure **29** is then cut in the cross machine direction in the adhesive area **34** by any suitable means, such as a cutting device **40**, such that a severed piece of multi-ply fibrous structure **29'** is formed. As a result, the adhesive area **34** is split into two distinct portions **34'** and **34''**. Alternatively, the adhesive area **34** may be only on one side of the severing line rather than on both sides.

As shown in Fig. 4, the severed piece of multi-ply fibrous structure **29'**, which includes adhesive portion **34''** can be rewound on a core **42** or on itself if no core is used concurrently with



the cutting operation or subsequent to the cutting operation. Upon rewinding the severed pieces of multi-ply fibrous structure **29'** onto the core **42**, the severed piece of multi-ply fibrous structure **29'** comprises a tail **44** which comprises a tail end **46**. The tail **44** comprises the adhesive portion **34''** (consumer accessible tab precursor), which ultimately forms the consumer accessible tab on the multi-ply product once the severed piece of multi-ply fibrous structure **29'** has been completely rewound around the core **42**.

The uncut multi-ply fibrous structure **29** can then be attached to a new core by its core end **48** in order to start rewinding the next severed piece of multi-ply fibrous structure. The uncut multi-ply fibrous structure **29** comprises adhesive portion **34'**, which extends from the core end **48** along the uncut multi-ply fibrous structure **29**.

All documents cited in the Detailed Description of the Invention are, in relevant part, incorporated herein by reference; the citation of any document is not to be considered as an admission that it is prior art with respect to the present invention.

While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.